



Digital Map Display

Wish List: A Survey of Air Force Users

Denise L. Aleva

Human Effectiveness Directorate

Air Force Research Laboratory

Wright-Patterson AFB, Ohio

(937) 255-0883

denise.aleva@he.wpafb.af.mil



PROBLEM

**Transition from paper to digital
Mapping, Charting and Geodesy
(MC&G) products**



APPROACH

**Create a warfighter-centered
knowledge engineering process
focused on assuring the utility
of the new digital map products**



SITES VISITED

- Trial on-site
 - Rickenbacker AFB, 12/95, 21 OSS/CC, KC-135
- Units / locations
 - Mountain Home AFB, 1/96, 366 OSS/INT, F-15C/E, F-16, B-1B
 - Tinker AFB, 2/96, 552 OSS/IN, E-3, Navy E-6A
 - Whiteman AFB, 2/96, 509 OSS/IN, B-2
 - Hurlburt Fld, 3/96, 16 SOF/DOX, AC-130
 - Hurlburt Fld, 3/96, 18 FLTS/TER, MH-53J
 - Holloman AFB, 4/96, 49 OSS/IN, F-117



RESEARCH TEAM

- **Senior research psychologist**
- **B-52 instructor radar navigator**
- **Human factors engineer**
- **Knowledge engineer**
- **Human factors psychologist**



STRUCTURE OF SURVEY

- **Obtain wing level briefing**
- **Conduct knowledge engineering session(s)**
- **Observe mission planning session**
- **Conduct detailed interviews**
- **Conduct aircraft lighting and environmental measurements**



STATISTICS

- **6 regular Air Force units**
- **1 Air Force reserve unit**
- **10 Aircraft (6 primary / 4 “serendipitous”)**
- **2 Simulation / training facilities**
- **12 Concept maps**
- **70 Interviews**
- **10 Mission planning systems**
- **42 Products**



DIGITAL MAP DISPLAY WISH LIST

- **Common digital display**
- **Map currency information**
- **Automated CHUM**
- **Real-Time Updates**



DIGITAL MAP DISPLAY WISH LIST

- All information available on one map
- Data Layers
- Embedded Products
- Customize Map
- Create own overlays (“Tailoring”)
- Map Modifications



DIGITAL MAP DISPLAY WISH LIST

- **Zoom with greater resolution**
- **Slew**
- **Conversions**
- **Orientation**
- **Map Modes**



DIGITAL MAP DISPLAY WISH LIST

- **Perspective**
- **Temporal Maps**
- **Course Predictions**
- **In-Flight Replanning**
- **3-D Immersion**



HUMAN FACTORS ISSUES

- **Imagery**
- **Map/Chart design**
- **Environment**
- **System variables**
- **User population**



IMAGERY ISSUES

- **Seasonal variation**
- **Correlation with map/chart**
- **Symbology and text overlays**



MAP/CHART DESIGN ISSUES

- **Resolution vs. clutter**
- **Multiple datums**
- **Symbology**
- **Color Coding**



ENVIRONMENTAL ISSUES

- **Light intensity**
- **Ambient light color**
- **Non-NVG-compatible products**
- **Cockpit incompatibility**



SYSTEMS ISSUES

- **Computer systems**
- **Output devices**
- **Photocopying devices**
- **Data Resolution**



USER POPULATION ISSUES

- Individual needs/preferences
- Color vision perception



HUMAN FACTORS OBSERVATIONS

- **Digital maps are only beginning to get out into the cockpit -- “fire prevention” stage**
- **User community is more sophisticated**
- **Emerging synthesis with commercial GIS**
- **Potential impact of RTIC**



PAYOUTS

- **Mission effectiveness**
- **Improved situation awareness**
- **Reduced workload**
- **Safety of flight**